H. St. John.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 27. August, 1925. No. 320.

OXALIS CORNICULATA AND ITS RELATIVES IN NORTH AMERICA.

K. M. Wiegand.

(*Continued from page 124.*)

6. O. FLORIDA Salisb. Prod. Strip. All. 322 (1796). *O. Dillenii β florida* DC. Prodr. i. 692 (1824). *O. glauca* Raf. in DC. l. c. *O. filipes* Robins. & Fernald in Gray's Man. ed. 7, not Small. *O. Brittoniae* Small in Britton's Man. 577 (1901). *Xanthoxalis Brittoniae* Small, Fl. S. e. U. S. 668 (1903), and N. A. Flora. *X. colorea* Small., Fl. S. e. U. S. 668 (1903), *O. colorea* Fedde in Just's Bot. Jahresb., xxxii. Pt. 1, 410 (1905).—Stems erect, rarely decumbent at base, brownish when dry; leaves scattered on slender loosely hairy petioles; stipules nearly obsolete; leaflets 5–18 mm. broad, glabrous above, slightly hairy beneath, green or sometimes purple, glaucous; peduncles exceeding the leaves; pedicels 5–25 mm. long, slender, substrigose; flowers 7–11 mm. long, heterogamous (?); corolla glabrous; filaments smooth or hairy; capsule short-cylindrical, gradually tapering toward apex; styles long and slender (3–4 mm. long), sometimes short (2 mm. long); seeds 1.0–1.2 mm. long, poorly developed.—Chiefly in dry fields of light or stony soil; Maine to central New York and Florida, mainly toward the coast but apparently not on the Coastal Plain. Some specimens examined: MAINE: Falmouth, *E. B. Chamberlain & J. F. Collins,* no. 597; North Belgrade, *M. L. Fernald.* NEW HAMPSHIRE: Merrimack county, 1916, *H. L. Clark.* VERMONT: Brookline, 1917, *L. A. Wheeler.* MASSACHUSETTS: Attleboro, 1916, *F. F. Forbes;* Northampton and Sheffield, *M. L. Fernald;* six other specimens all from western Massachusetts. RHODE ISLAND: Cumberland, 1904, *B. L. Robinson, E. F. Williams.* CONNECTICUT: West Hartford, 1904, *C. H. Bissell;* Salisbury, and Lakeville, 1902, *Fernald,* also others; Southbury, *C. A. Weatherby,* no. 1739; Fairfield, *E. H. Eames,* no. 8340; Oxford, 1903 and 1904, *E. B. Harger;* West Cheshire, *A. E. Blewitt,* no. 853. NEW YORK: northern N. Y., *A. Gray* (?); central N. Y., *A. J. Eames & L. H. MacDaniels,* no. 2736, 4478,

Wiegand & Eames, no. 10201, 12370, *A. J. Eames*, no. 10202, 10203, 13694, *K. M. Wiegand*, no. 12368, 12369, 14003, 14810, 14811; VanCortlandt, N. Y. City, and Riverdale, *E. P. Bicknell;* Bronx Park, *G. V. Nash.* PENNSYLVANIA: Lancaster County, 1900, *A. A. Heller.* VIRGINIA: Williamsburg, *E. J. Grimes*, no. 3849. NORTH CAROLINA: Madison County, *J. R. Churchill;* Biltmore, *Biltmore Herb.* no. 5383a. FLORIDA: Duval County, 1897, *J. R. Churchill.*

Var. **strigosifolia** var. nov. Foliis pagina superiori strigosis. Upper surface of the leaves strigose. New Hampshire, New York and Missouri. Specimens examined: NEW HAMPSHIRE: Walpole, 1903, *W. W. Eggleston;* North Walpole, 1903, *W. H. Blanchard.* NEW YORK: Spencer, *K. M. Wiegand*, no. 14811 (TYPE in Cornell Herb.). MISSOURI: Doniphan, *B. F. Bush*, no. 277. ? ARKANSAS: Camden, 1850, *A. Fendler.*

With some hesitation the name *O. florida* Salisb. has been adopted for this species. Salisbury cited "Oxy lutea americana humilior et annua. Dill. Hort. Elth. 298 t. 221 f. 288" on which *O. Dillenii* Jacq. was founded, and which is interpreted as *O. stricta.* In his description, however, he said, "stylis filamentis longioribus. . . . Herba nostrae stirpis saturate purpurea." which suggests *O. europaea* or the present species. De Candolle (Prodr.), who seems to have had some definite knowledge of the Salisbury plant, considered the name a synonym of *O. glauca* Raf. (then ined.), and both a variety of *O. stricta* (*O. Dillenii*). In the Gray Herbarium are two specimens of the present species that were compared by Professor Fernald with plants in the De Candollean herbarium. One bears a note by Fernald as follows: "This specimen except that it is more mature is quite the same as a specimen of 'Oxalis florida Sal. - Dillenii Jacq. *M. Salisbury* 1816' [The latter in handwriting of DC.] under *O. Dillenii*, β *florida* in Prodr. Herb." The other bears this inscription by Fernald: "This is exactly matched (1 & 2) by the specimen of '*Oxalis glauca Raf. n. sp. ? Philada.* Rafinesque, 1819' in Prodr. Herb. under *O. Dillenii* β *florida* [underscored portion of label Rafinesque's; the other DC's.]". It seems most likely therefore that Salisbury's plant belonged to the present species, as did also Rafinesque's.

7. O. EUROPAEA Jord. in Schultz, Arch. Fl. Franc. et Allem. 309 (1854). *O. ambigua* Salisb. Trans. Linn. Soc. ii. 242 (1794), not Jacq. Oxal. 80 (1794). *O. stricta* of most early authors, also Trelease in Gray's Synopt. Fl. i. 366 (1897). *O. corniculata* var. *stricta* Trelease, Mem. Bost. Soc. Nat. Hist. iv. 88 (1888). *O. corniculata* Robinson & Fernald in Gray's Man. ed. 7. 534 (1908).—Stem 5–40 cm. high, simple or branched, usually erect, clothed with scattered ascending

hairs or glabrate; leaflets 33 mm. broad or smaller, generally thin, glabrous above, glabrate beneath; petioles 2–8 cm. long, slender, nearly or quite glabrous; peduncles generally exceeding the subtending leaves, slender, with a few strigose hairs; pedicels slender, strigose; calyx 3–5 mm. long, nearly or quite glabrous; flowers homogamous; corolla 5–10 mm. long, glabrous; filaments glabrous or hairy; capsule 8–12 mm. long, gradually acute; style short (2 mm. long), less commonly elongated (4 mm. long); seeds 1.2 (1.4) mm. long.—Quebec to North Dakota, southward to Georgia, Tennessee, Oklahoma, Colorado and Arizona; also introduced in Europe and probably in other countries. Apparently not common on the Atlantic Coastal Plain of North America.

Forma **pilosella** f. nov. Ab *O. europaea* typica recedit caulibus villosis. Similar to the typical form of *O europaea* in pubescence of leaves and pedicels but stem and generally the petioles and peduncles villous. Rhode Island, Missouri and probably elsewhere. Specimens examined: RHODE ISLAND: Middletown, *Margaret B. Simmons.* MISSOURI: Greenwood, *B. F. Bush,* no. 6701 (TYPE in Gray Herb.).

Forma **cymosa** (Small) comb. nov. *O. cymosa* Small, Bull. Torr. Bot. Club xxiii. 267 (1896). *O. rufa* Small, in Britton's Man. 577 (1901). *Xanthoxalis cymosa* Small, Fl. S. e. U. S. 668 (1903), and N. A. Flora.—Stem nearly or quite glabrous; upper surface of leaflets glabrous; pedicels villous and more or less viscid. Quebec to Michigan, southward to North Carolina, Tennessee and Missouri. A common form in the northeastern United States, but apparently not common on the Atlantic Coastal Plain. The identification of *O. cymosa* Small with this form rests on Small's statement of stem subglabrate and pedicels villous.

Forma **villicaulis** f. nov. Formae *cymosae* similis sed caulibus villosis. Similar to forma *cymosa* but the stems villous. Chiefly in the interior: Nova Scotia and Massachusetts to Michigan, southward to Virginia, Tennessee, and Illinois. Many specimens were seen: type specimen (in Gray Herb.), Port Huron, Michigan, 1914, *C. K. Dodge,* no. 41.

Var. **Bushii** (Small) comb. nov. *O. Bushii* Small, Bull. Torr. Bot. Club xxv. 611 (1898). *Xanthoxalis Bushii* Small, Fl. S. e. U. S. 667 (1903). *X. interior* Small, Fl. S. e. U. S. 668 (1903). *O. interior* Fedde in Just's Bot. Jahresb. xxxii. pt. 1, 410 (1905).—Stem conspicuously villous; petioles and peduncles generally more or less villous; upper surface of the leaflets with scattered hairs; pedicels strigose, not viscid. Waverley, Massachusetts, and from western Ontario to Michigan, Illinois and Missouri. Specimens examined: MASSACHUSETTS: Waverley, 1895, *Robinson, Greenman & Schrenk.* ONTARIO: Lambton County, *C. K. Dodge,* no. 42. MICHIGAN: Port Huron, *Dodge,* no. 40. ILLINOIS: Urbana, 1901, *H. A. Gleason;* Morgan Park, *A. Chase,* no. 925. MISSOURI: many specimens, *Bush,* no. 30 (type collection), 315, 3283, 3297, 4032, 6754.

var. lamulosa Benke. Ill. Rhod. 31: 149. 1929.

Forma **subglabrata** f. nov. Ab var. *Bushii* recedit caulibus substrigosis vel glabratis. Differing from var. *Bushii* in the glabrate or substrigose stems.—Illinois, Missouri and Iowa. Specimens examined: ILLINOIS: Peoria, 1903, *F. E. McDonald.* MISSOURI: Courtney, *B. F. Bush,* no. 7678. IOWA: Ames, *Pammel & Ball,* no. 4 (TYPE in Gray Herb.).

Forma **vestita** f. nov. Var. *Bushii* similis sed caulibus villosis et pedicellis villosis viscidis. Similar to var. *Bushii* but stems and pedicels villous, the latter usually viscid. Massachusetts and Illinois. Specimens examined: MASSACHUSETTS: Cambridge, 1904, *Miss I. W. Anderson* (TYPE in Gray Herb.). ILLINOIS: Riverdale, *O. E. Lansing Jr.,* no. 2625; La Salle County, *Greenman, Lansing & Dixon,* no. 144; Makanda, 1902, *H. A. Gleason,* no. 2449.

O. europaea is with little doubt a native of America, but was introduced into Europe about 1658. It seems to have been cultivated by Morison in 1660 and was figured by him in his Historia. An outline of the early history of this species in Europe is given by Ascherson and Graebner.[1] The European material all has appressed-pubescent pedicels (except one specimen from Germany), subglabrous stems, and glabrous upper leaf surfaces, and this form is therefore taken as the type of the species.

8. O. GRANDIS Small, Bull. Torr. Bot. Club, xxi. 475 (1894). *O. recurva* Trelease, Mem. Bost. Soc. Nat. Hist. iv. 89 (1888), not Ell. *Xanthoxalis grandis* Small, Fl. S. e. U. S. 668 (1903), and N. A. Flora.—Plants tall and coarse, erect; stems very sparingly pubescent with scattered subappressed or spreading hairs; stipules nearly obsolete; petioles villous; leaflets glabrous above and with a few hairs beneath; peduncles scarcely exceeding the leaves, strigose or more commonly villous; inflorescence umbellate or sometimes cymose, 1–several-flowered; pedicels slender, strigose; corolla 12–18 mm. long, glabrous; filaments generally hairy; capsules short-oblong-ovoid, 7–10 mm. long; seeds (fide Small) 2 mm. long.—Pennsylvania to Illinois, southward to Georgia and Alabama (Small), but not along the coast. Specimens examined: PENNSYLVANIA: Wysox, *Carey* (type collection ?). DISTRICT OF COLUMBIA: 1897, *E. S. Steele.* VIRGINIA: Smyth County, 1892, *J. K. Small.* NORTH CAROLINA: Waynesville, *E. E. Magee;* Polk County, 1899, *J. R. Churchill;* Biltmore, *Biltmore Herb.,* no. 1225a; Swain County, 1891, *Beardslee & Kofoid.* KENTUCKY: Harlan County, 1893, *T. H. Kearney Jr.,* no. 11 and 280; Knoxville, *A. Ruth,* no. 282. OHIO: *Werner;* Cincinnati, *C. G. Lloyd.* ILLINOIS: near Mt. Carnel, *J. Schneck.*

This species is related to *O. europaea* of which in appearance it seems to be a gigantic form, but the capsules are short even for that species

[1] Synop. Mitteleu. Fl. vii. 149 (1913).

and the seeds according to Small's description are larger and may have more interrupted ridges. Mature seeds have not been seen by the writer. In one specimen (Cincinnati, C. G. Lloyd) the leaves are strigose above and the plant is otherwise much more hairy than usual.

9. O. Suksdorfii Trelease, Mem. Bost. Soc. Nat. Hist. iv. 89 (1888), Small, Bull. Torr. Bot. Club xxiii. 456 (1896). *O. pumila* Nutt. in Torr. & Gray's Fl. N. A. i. 212 (1838), not d'Urv. (1826). *Xanthoxalis Suksdorfii* Small, N. A. Flora xxv. 53 (1907).—Stems 5–18 cm. high, generally erect from creeping woody stolons, rather slender, sparingly villous; stipules oblong or generally nearly obsolete; petioles filiform, villous; peduncles slender, appressed-villous; pedicels filiform, 6–20 mm. long, strigose; corolla 12–16 mm. long, glabrous; filaments generally hairy; capsule very short-oblong or ovoid-conic, little exceeding the calyx, tapering toward apex, crisp-puberulent. Banks and woods, yards and parks: Oregon (California, Small[1]).

The writer has not seen specimens of this species from California, but the plant may possibly occur in that part of the state bordering Oregon. *O. pumila* d'Urv.,[2] though regarded in the Index Kewensis, as a synonym of *O. enneaphylla* Cav. is not certainly so, and therefore, according to the International Rules, Nuttall's name should not be used.

10. O. recurva Ell. Sketch Bot. S. Car. and Ga. i. 526 (1821); Small, Bull. Torr. Bot. Club, xxi. 474 (1894); Britton & Brown's Ill. Fl. N. Sta. and Can. ed. 1. (1898); Britton, Manual N. Sta. & Can. 577 (1901); also in part, Trelease in Gray's Synopt Fl. i. 366 (1897), not Trelease in Mem. Bost. Soc. Nat. Hist. iv. 89 (1888). ? *O. Lyoni* Pursh, Fl. Am. Sept. i. 322 (1814). *Xanthoxalis recurva* Small, Fl. S. e. U. S. 668 (1903), and N. A. Flora.—Stems upright, 5–15 cm. high, from creeping rootstocks, villous with more or less spreading tawny hairs; petioles slender, villous; stipules small or obsolete; leaflets rather thin, glabrous above, sparingly hairy beneath; peduncles with subappressed pubescence; pedicels slender, 7–18 mm. long, strigose; corolla 13–18 mm. long, glabrous; filaments generally hairy; mature capsule not seen (slender according to Small).—Dry sandy more or less open soil: North Carolina to Georgia. Specimens examined: North Carolina: Columbus, 1900, *E. C. Townsend*, (Cornell Herb.). South Carolina: Coastal Plain near Ashley River, *B. L. Robinson*, no. 188. Georgia: Sylvania, *R. M. Harper*, no. 2082.

Trelease extended the range of this species to Pennsylvania and Texas, and Small attributed it to Missouri and Mississippi. The writer has not seen specimens from these states. According to Small

[1] Bull. Torr. Bot. Club xxiii. 456 (1896), and N. A. Flora.
[2] Mém. Soc. Linn. Paris iv. 616 (1826).

the above form agrees well with Elliott's type in the Charleston Museum.

Var. **texana** (Small) comb. nov. *Xanthoxalis texana* Small, Fl. S. e. U. S. 667 (1903), and N. A. Flora. *O. texana* Fedde in Just's Bot. Jahresb. xxxii. pt. i. 410 (1905). Similar to typical *O. recurva* in habit but the stems, petioles and pedicels appressed-pubescent; leaflets either glabrous or hairy on the upper surface. TEXAS: *Wright* (type collection?). MEXICO: Monterey, *W. M. Canby*, no. 54.

Var. **macrantha** (Trelease) comb. nov. *O. corniculata*, var. ? *macrantha* Trelease, Mem. Bost. Soc. Nat. Hist. iv. 88 (1888). *O. macrantha* Small, Bull. Torr. Bot. Club xxiii. 268 (1896), not of Fl. S. e. U. S., nor of N. A. Flora. *O. recurva* in part, Trelease in Gray's Synopt. Fl. l. c. *O. hirsuticaulis* Small, Bull. Torr. Bot. Club, xxv. 611 (1898). *Xanthoxalis hirsuticaulis* Small, Fl. S. e. U. S. 669 (1903), and N. A. Flora. *O. Priceae* Small, Bull. Torr. Club, xxv. 612 (1898). *Xanthoxalis Priceae* Small, Fl. S. e. U. S. 669 (1903).—Stems and petioles shaggy with spreading pubescence; peduncles pilose; corolla sparsely hairy outside or glabrate; filaments generally hairy; capsule cylindrical, about 15 mm. long; seeds 1.4 mm. long.—Kentucky, Tennessee, and Alabama. Specimens examined: KENTUCKY: Bowling Green, 1889 and 1900, *Sadie F. Price*. ALABAMA: *Hatch*.

Forma **sericea** f. nov. Ab var. *macrantha* recedit foliis utrinque strigosis. Leaflets rather strongly appressed hairy on both faces. ALABAMA: old specimen in Gray Herb. (TYPE.)

Var. **floridana** var. nov. *Xanthoxalis macrantha* Small Fl. S. e. U. S. 667 (1903), probably, and N. A. Flora, not *O. macrantha* Small, Bull. Torr. Bot. Club. xxiii. 268 (1896). *O. recurva*, in part, Trelease, in Gray's Synopt. Fl. i. 366 (1897).—Caulibus subadpresso-pubescentibus, foliis pagina superiori strigosis. Stems more diffuse than in the typical form, from less evident rootstocks and with more ascending pubescence; peduncles shorter; leaflets strigose on the upper surface; pedicels with appressed pubescence.—Florida. Specimens examined: Apalachicola, *Drummond*. East Florida, *Herb. D. C. Eaton* (TYPE in Gray Herb.).

The writer can find no good specific characters to separate *O. recurva* and its var. *floridana*, *O. texana*, *O. macrantha* and *O. Priceae* as is done by Small. The differences seem to be in degree and type of pubescence only, and even these differences vary greatly. With the exception of the var. *floridana* the plants all have a rather characteristic appearance, consisting of an erect stem arising from long horizontal rootstocks and surmounted by flowers rising considerably above the leaves.

The nomenclature in this group of large flowered eastern forms is difficult to decipher. The identity of *O. recurva* Ell. is now quite

certain, as Small has seen the type. Trelease's transfer of the name to what is now *O. grandis* was an error. The *O. corniculata*, var.? *macrantha* Trelease was incompletely understood, as the author himself indicated by the question mark. It probably included some specimens of the western *O. Wrightii*, var. *pilosa* as well as the eastern type. The variety was described as having the branches i. e. the upright stems?) pilose. Specimens in the Gray Herbarium marked var. *macrantha* by Trelease have hirsute or pilose stems. Small based his species *O. macrantha* on the var. *macrantha* of Trelease and described the stems as "hirsute" and petioles "pubescent like the stem." Later however he described *O. hirsuticaulis* as having "densely hirsute" stems, and the petioles "villous-hirsute," at the same time transferring the name *O. macrantha*[1] to a plant with "strigillose" stems and "strigillose" pedicels. *O. macrantha* rather than *O. hirsuticaulis* is therefore the proper name for the hirsute form of *O. recurva*. The original description of *O. Priceae* Small also agrees with our var. *macrantha*, as do two specimens of *O. Priceae* in the Gray Herbarium collected by Miss Price. Small states[2] that a pubescent corolla has been found by him only in *O. Priceae* among the yellow flowered species of Oxalis. The specimens of var. *macrantha* cited above all have some hairs on the corolla.

Cornell University, Ithaca, N. Y.

A WHITE FORM OF DELPHINIUM AJACIS.

R. H. Cheney.

During the summer of 1924, while collecting representative types of New England flowering plants for the Washington Square College Herbarium at New York University, I found two localities where a *pure* white growth of *Delphinium Ajacis* L. was abundant. Both areas were wet, waste ground. The first growth was noted in Forest Hills, Massachusetts, on July 24, 1924. The other station was in Raymond, New Hampshire, on August 13, 1924.

The genus *Delphinium* includes only two unipistillate species in the United States; namely,—*D. Ajacis* L. (Rocket Larkspur), with pubescent follicles and *D. Consolida* L. (Field Larkspur), with glabrous

[1] Fl. S. e. U. S. 667 (1903).
[2] Bull. Torr. Bot. Club xxv. 613 (1898).

follicles. Several authorities, including Dr. Small,[1] mention a white-flowered *D. Consolida* L. but only one authoritative flora[2] of the United States records *D. Ajacis* L., to which these specimens undoubtedly belong, as having white flowers. Britton and Brown's record is "rarely white."

Mr. Bayard Long[3] clarified the confusion existing in American floras between *D. Ajacis* L. and *D. Consolida* L. The common Rocket Larkspur, which has been an escape from cultivation in this country at least since 1814, has been described in all early floras as having smooth follicles. Pursh's Flora (1814); Nuttall's Genera (1818); Eaton's Manual Bot. ed. 5 (1829); Torrey & Gray in 1838; and Gray's Man. Bot. ed. 1 (1848), all described the common Larkspur escape as *D. Consolida* L. Darby[4] recorded the plant, *Delphinium Consolida* L., as having smooth *or* pubescent follicles. Gray (Watson & Coulter ed.) Man. Bot. (1890) was the first record in American floras to distinguish the pubescent-follicled plant as *D. Ajacis* L. in agreement with the European species description. *D. Consolida* L., however, remained in the floras as a common species although only five American herbarium sheets substantiate its existence. Dr. Britton states clearly in Britton & Brown Illust. Fl. (1914) that all specimens examined at that time proved to be *D. Ajacis* L. My examination of the same and additional material at the N. Y. Botanical Garden, verified the statement and also showed that no *pure* white specimens were present.

This unipistillate, pubescent species is normally a blue-flowered plant although the flowers are commonly faded to a very considerable degree, especially the older flowers of the raceme, and frequently only a trace of color persists. Such a trace, however, was found to be present in all cases with the exception of one Virginian specimen which appeared to have been distinctly white. A brief statement concerning the essentially white-flowered specimens in the N. Y. Botanical Garden Herbarium follows:—

One European specimen—nearly white; collected in 1868.
Another European specimen—bluish tinge; collected in 1839 by Rev. J. G. Leefe.
Roanoke, Virginia specimen—bluish and pink tinge on the same plant. Collected in 1890.

[1] Small Fl. So. East. U. S. (1903) 433.
[2] Britton & Brown Illust. Fl. No. U. S., Canada, etc. ed. 2, 2 (1913) 94.
[3] Long *Delphinium Consolida* L. in Amer., etc., in Rhodora No. 212, 18 (1916) 169–177.
[4] Darby Bot. of the So. States (1859) 207.

Beleu, El Paso Co., Texas—One small specimen with only two flowers. These were whitish. Collected in June 1893 by Dr. E. A. Mearns.
Independence, Missouri specimen—pinkish-white; collected in June 1895 by B. F. Bush.
Sand Hills, Augusta, Georgia—Spur bluish; collected by A. Cuthbert. No date given.
Blacksburg, Virginia specimen—In full flower and distinctly white; collected in June 1895 by Dr. W. A. Murrill. This specimen is undoubtedly *D. Ajacis* L., and I believe it represents another locality for the form which is given here as new.
Winfield, Kansas specimen—bluish tinge; collected in April 1898 by Mark White.
Pictou, Nova Scotia specimen—Slight pink tinge on spur; collected in August, 1906 by C. B. Robinson.
Cumberland River region, Western Kentucky specimen—pinkish-white; collected in June 1909 by W. W. Eggleston.

Several other American records in respect to essentially white Delphiniums occur in the literature but they prove to be either copied statements from earlier works or to be horticultural hybrids. Bailey[1] describes the *D. Ajacis* L. perianth as 'varying to white.' Davis[2] also records the flower color by the same wording. The Amer. Comm. Hort. Nomen. on Standard Plant Names (1923) 123, mentions a so-called 'White Siberian Delphinium.' This is, however, a hybrid or at least a horticultural form of *D. grandiflorum*, not *D. Ajacis* L. The Gray Herbarium and the Herbarium of the New England Botanical Club have no *pure* white specimens of *D. Ajacis* L.

A study of European floras for their descriptions of *D. Ajacis* L. reveals the same generalization regarding the perianth color as 'whitish, rarely white' etc., as is found in our American floras. In many instances, I suspect, the statement is merely a copy from earlier works. Coste, Flore de la France 1 (1901) 49, records the flowers of *D. Ajacis* L., as blue, pink or white. Gillet & Magne, Nouv. Flore Française (1883) 17, mention the perianth as colored; Grenier & Godron, Flore de France 1(1848) 47, as blue, white or pink; Rouy & Foucaud, Flore de France 1 (1893) 131, as blue, pink or white; Thomé's Flora von Deutschland 2 (1886) 122 as blue, white or red; Bentham, Brit. Flora ed. 4 (1878) 15, as blue, white or reddish; Sowerby, Engl. Bot. 1 (1899) 62, as bright French blue, more rarely white or pink, paler on the outer side; Hegi, Illustrierte Flora von Mittel-Europa 3 (1909–13) 488, as blue-violet, rarely pink or white. Examination of the European specimens, however, in the herbaria of the N. Y. Botanical Garden, of the Brooklyn Botanic Garden, and of the Gray Herbarium showed no *pure* white specimens.

[1] Bailey Cycl. Hort. 2 (1914) 976.
[2] Davis, K. C. Taxon. Study of No. Amer. Ranunc. (1900) 435.

As a pure white growth of *D. Ajacis* L. was found in two states in New England during the summer of 1924, and since all available herbarium records, with the possible exception noted above, show traces, at least, of color, these specimens seem to represent a true form which is as well established locally in New England as the species itself. Both are escapes. I have named the form,—Delphinium Ajacis L. forma **alba**, forma nova.

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BIDENS EATONI AND ITS VARIETIES.

Norman C. Fassett.

It frequently happens that, on the mouths of rivers, the influence of the tide extends farther up the river than does the salt water. The plants growing on these river shores will, therefore, alternately be submerged by fresh water and exposed to the sun. The part of the river where this phenomenon occurs is called the estuary. *Bidens Eatoni* was described in 1903 from the estuary of the Merrimac River, and has been shown by subsequent investigation to be a strictly estuarine species, on the mouths of several rivers from the Hudson to the Kennebec. It is remarkable that on each estuary where this species appears it occurs in a slightly different phase, that is, it shows a great development of endemic varieties.

Bidens Eatoni is most closely related to *B. bidentoides*, *B. connata*, and *B. heterodoxa*, all of which are characterized by having striate achenes which are, at least at the base, upwardly barbed along the margins, and simple leaves which are often deeply 3-cleft. From the two latter species *B. Eatoni* and *B. bidentoides* differ in having less than 30, usually 8–25, flowers to each cylindric to campanulate head, as opposed to 30–60 flowers in the heads of *B. connata* and *B. heterodoxa*. *B. bidentoides*, which has copiously pubescent achenes, plano-convex in cross-section, without conspicuous midribs, and with very slender awns (at least ½ as long as the body of the achene), is at once distinguished from *B. Eatoni*, with its sparingly pubescent, flat to bi-convex achenes, with conspicuous midribs and stout awns.

Bidens Eatoni breaks up into varieties as follows:

a. Inner achenes 6.8–9 mm. long: awns 2, rarely 4 *b*
b. Heads narrowly cylindric, at least when young *c*
c. Awns retrorsely barbed.....var. *typica.*
c. Awns antrorsely barbed.....var. *fallax.*
b. Heads broadly cylindric to campanulate *d*
d. Inner bracts of the involucre striated with dull yellow to dark brown: lower leaves often 3-parted *e*
e. Awns 1.5–4 mm. long, retrorsely barbed.....var. *interstes.*
e. Awns 0.5–2 mm. long, barbed both retrorsely and antrorsely.....var. *mutabilis.*
d. Inner bracts of the involucre striated with lustrous amber to purple brown, lustrous black in age: leaves all simple.....var. *simulans.*
a. Inner achenes 9–11 mm. long: awns 4, rarely 2 *f*
f. Heads usually cylindric: leaves with petioles 1–3 cm. long, the lower usually divided.....var. *kennebecensis.*
f. Heads subcylindric to campanulate: leaves subsessile or with short broad-winged petioles, not divided.....var. *major.*

B. Eatoni, var. **typica.** *B. Eatoni* Fernald, Rhodora v. 92. fig. 11–13 (1903). Massachusetts: estuary of the Merrimac River, at Newburyport, West Newbury, Salisbury, and Amesbury.

B. Eatoni, var. fallax Fernald, l. c. fig. 14. Occasional with the typical form.

B. Eatoni, var. **interstes** (Fassett), n. comb. *B. heterodoxa* (Fernald) Fernald & St. John, var. *interstes* Fassett, Rhodora xxvi. 178 (1924). Plants 1–8 dm. tall: leaves lanceolate to narrowly ovate, serrate, 0.5–1.5 dm. long, narrowed to a winged petiole, the lower often deeply cleft or 3-parted: heads campanulate, the terminal 8–10 mm. high, 8–12 mm. broad; outer bracts of the involucre 2–5, usually 3, lanceolate, acute, sometimes minutely toothed toward the apex; inner bracts striated with dull yellow to dark brown: achenes flat or with slightly keeled midribs, the outer 5.5–6.5 mm. long, the inner 6.5–8 mm. long, on the margins downwardly barbed except at the base where one or more barbs stick upward; awns 2, rarely 4, retrorsely barbed, 1.5–4 mm. long, the inner pair if present shorter.—Maine: tidal shores at the mouth of Eastern River, Dresden, September 13, 1924, *N. C. Fassett,* no. 2122; tidal shores of the Kennebec River, Hatch's Corners, Dresden, September 9, 1924, *N. C. Fassett,* no. 2101; South Gardiner, September 16, 1924, *N. C. Fassett,* no. 2127; tidal shores of the Kennebec River, near the Maine Central R. R. ferry, Woolwich, September 18, 1924, *N. C. Fassett,* no. 2125; rocky places, tidal shores of the Kennebec River, Gardiner, September 18, 1923, *N. C. Fassett,* no. 852 (type in Gray Herb.); tidal shores, Sheepscot River, Alna, September 12, 1924, *N. C. Fassett,* no. 2120.

The small number of flowers in the heads of this plant shows it to belong not with *B. heterodoxa,* but with *B. Eatoni.* The achenes are similar to those of var. *typica,* but a little broader in proportion to their length, while the heads are campanulate instead of cylindric.

B. Eatoni, var. **mutabilis,** n. var., var. *interstitem* habitu foliisque

simulans; achaeniis exterioribus 5.5–6 mm. longis, interioribus 7–7.5 mm. longis; aristis 2, 0.5–2 mm. longis, retrorse antrorseque setosis.

Resembling var. *interstes* in habit and foliage: outer achenes 5.5–6 mm. long, inner 7–7.5 mm. long; awns 2, 0.5–2 mm. long, with barbs both retrorse and antrorse on the same awn, as well as along the margins of the achenes.—Estuary of the Kennebec River.—Maine: tidal shores of the Kennebec River, Cedar Grove, Dresden, September 9, 1924, *N. C. Fassett*, no. 2116 (type in Gray Herb.); tidal shores of the Kennebec River, Dresden, September 16, 1924, *N. C. Fassett*, no. 2123.

B. Eatoni, var. **simulans**, n. var., var. *interstitem* habitu achaeniisque simulans; foliis lanceolatis simplicibus; striis bractearum interiorum nitentibus sucino vel purpureo-fusco, aevo nigrescentibus nitentibus.

Resembling var. *interstes* in habit and fruit: leaves lanceolate, not divided: inner involucral bracts striate with lustrous amber to purple-brown, which turns lustrous black in age.—Estuary of the Connecticut River.—Connecticut: hidden among tall grasses and sedges in brackish marsh, Old Lyme, September 9, 1917, *R. W. Woodward;* brackish marsh, Old Lyme, October 1, 1915, *R. W. Woodward* (type in Gray Herb.); brackish marsh, Old Lyme, September 29, 1915, *R. W. Woodward;* sandy shore just above high water, Old Lyme, September 29, 1917, *R. W. Woodward;* tidal shores of the Connecticut River, Essex, October 13, 1924, *N. C. Fassett*, no. 2298; tidal shores of the Connecticut River, East Haddam, October 12, 1924, *N. C. Fassett*, no. 2299.

B. Eatoni, var. kennebecensis Fernald, Rhodora xix. 76 (1917). Estuarine system at the mouth of the Kennebec River, Maine. In it long achenes and narrowly cylindrical heads this variety is quite distinct from var. *interstes* and var. *mutabilis* of the same region.

B. Eatoni, var. **major**, n. var., planta 4–15 dm. alta, caulibus saepe prostratis nudisque infra; foliis lanceolatis 0.5–1.5 dm. longis simplicibus grosse serratis, petiolis brevibus alatis vel foliis angustatis ad basem subsessilem; capitulis subcylindratis vel campanulatis, terminalibus 1.3 cm. altis 18–30(–33)-floribus; bracteis exterioribus fere 3 linearibus acutis 1–2 cm. longis 2–3 mm. latis; achaeniis exterioribus 6–7.5 mm. longis aristis 3–4; achaeniis interioribus (8–)9–11 mm. longis costis saepe crassis ad apicem, aristis fere 4 retrorse setosis.

Plants 4–15 dm. tall, stems often reclining and naked below: leaves lanceolate, 0.5–1.5 dm. long, coarsely serrate but not divided, with short winged petioles, or narrowed to a sessile base: heads subcylindric to campanulate, the terminal 1.3 dm. high, 18–30(–33)-flowered: outer involucral bracts usually 3, 1–2 cm. long, 2–3 mm. broad, linear, acute: outer achenes 6–7.5 mm. long, awns 3–4 in number; inner achenes (8–)9–11 mm. long with midribs often somewhat thickened at the summit, awns usually 4, retrorsely barbed.—Connecticut: tidal shores of the Quinnipiac River, North Haven,

October 14, 1924, *N. C. Fassett*, no. 2301 (TYPE in Gray Herb.); tidal shores of the Quinnipiac River, North Haven, *N. C. Fassett*, no. 2302 (has 33 flowers in the largest heads, and somewhat resembles *B. laevis*). NEW YORK: shores of the Hudson River, near the upper limit of tide, Hudson, September 30, 1923, *H. K. Svenson*.

This plant as it grows on the estuary of the Quinnipiac River has prostrate bases which strongly suggest those of *B. laevis*. The Hudson River specimen lacks this characteristic, but is otherwise essentially like the Connecticut material. A single plant collected in Massachusetts, on tidal shores of the Merrimac River, Amesbury, October 16, 1924, *N. C. Fassett*, no. 2300, may belong with this variety, but may be var. *kennebecensis*. It was collected late in the season and is in such poor condition that it is difficult to determine its affinities.

The estuary of the Taunton River, in southeastern Massachusetts, extends from Wier Village to the northern part of the town of Berkeley, and up the Three Mile River to North Dighton. On these shores grow *Bidens connata*, *B. comosa*, *B. cernua*, and a fourth *Bidens* which seems most closely allied to *B. Eatoni*. It is much branched, with many small leaves and short cylindric heads. The achenes are somewhat flattened as in *B. Eatoni*, or angled and with keeled midribs as in *B. connata*, or trigonous. With the collections now available it is impossible to determine its exact status, but it seems at present best treated as a hybrid of *B. Eatoni* and *B. connata*. Botanists should keep this region in mind; collections made in late summer would probably throw more light on the affinities of this plant.

BIDENS **multiceps**, n. hyb. = *B. connata* × *Eatoni* (?), planta 2–6 dm. alta ramosissima super basem simplicem; foliis lanceolatis simplicibus 2–4 cm. longis integris vel cum dentibus utrinque 1–2 instructis; petiolis brevibus; capitulis multis late cylindratis, terminalibus 4–7 mm. altis 15–18-floris; bracteis exterioribus 1–1.5 cm. longis integris latioribus ad apicem obtusum; achaeniis exterioribus 4–7 mm. longis, planis, 2–4 aristis retrorso-barbatis; achaeniis interioribus 7–8 mm. longis, planis vel trigonis vel saepe in costis alatis, aristis 2–4 retrorso-barbatis.

Plants 2–6 dm. tall, much branched above the simple base: leaves lanceolate, short-petioled, 2–4 cm. long, entire or with 1–2 pairs of teeth: heads numerous, broadly cylindric, the terminal 4–7 mm. tall, 15–18-flowered; outer involucral bracts 1–1.5 cm. long, entire, broader toward the obtuse apex: outer achenes 4–7 mm. long, flat, with 2–4 retrorsely barbed awns; inner achenes 7–8 mm. long, flat, trigonous, or often with keeled midribs, awns 2–4, retrorsely barbed.—Estuary

of the Taunton River.—Massachusetts: tidal shores of the Taunton River, Dighton, October 21, 1923, *Johnston & Fassett*, no. 905; tidal shores of the Taunton River, Berkeley, October 21, 1923, *Johnston & Fassett*, no. 903; tidal shores of the Three Mile River, Dighton, October 21, 1923, *Johnston & Fassett*, no. 906 (type in Gray Herb.).

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THE AMPHIBIOUS GROUP OF POLYGONUM, SUBGENUS PERSICARIA.

E. E. Stanford.

(*Continued from p. 129.*)

As the next advance in the study of these plants Gray[1] proposed *Polygonum Hartwrightii*, differentiating it chiefly by the spreading foliaceous rim of the ocrea, with the comments:

"Fruit unknown. I collected this almost 40 years ago at the head of Cayuga Lake [N. Y.] along with the remarkable *P. amphibium* var. *Muhlenbergii* of Meisner, which is widely distributed in North America. I saw it several years ago . . . in a high bog near the southern borders of Herkimer County, but not in flower. I have also a well developed specimen from the State collection in Michigan. Not regarding the stipules, it had been taken for one of the various puzzling varieties of *P. amphibium*, or, where the stipules were noticed, for an undeveloped condition of *P. Careyi*. But my attention having been called to it by Dr. S. Hart Wright, of Penn Yan, who finds it in open bottom land, among Carices, at Dundee, Yates County, New York, I am desirous that it should bear his name, as the real discoverer of its specific characters."

Watson[2] took up the varietal name of Meisner for *P. coccineum*, and published *P. Muhlenbergii:*

"New England to Texas and westward to Washington Territory and northern California . . . . . including most of the var. *terrestre* of American botanists. Our subterrestrial form of *P. amphibium* seems rarely if ever to correspond to the var. *terrestre* of Europe."

The same writer, in including *P. Hartwrightii* in his Botany of California, remarked that it "Varies greatly . . . approaching *P. amphibium* too closely."

Britton[3] revived for the same plant the varietal designation of

[1] Gray, Proc. Am. Acad. viii. 294 (1870).
[2] Watson, Proc. Am. Acad. xiv. 295 (1879).
[3] Britton, Trans. N. Y. Acad. Sci. viii. 73 (1889).

Michaux, as *P. emersum* (Michx.) Britton, and this name has been used by several later writers. In the sixth edition of Gray's Manual the aquatic plant corresponding to *P. natans* (Michx.) Eaton is listed as *P. amphibium* L., *P. coccineum* as *P. Muhlenbergii* Wats., and *P. Hartwrightii* is also included as a species. These three general groupings have been followed in most later American floristic works. A few years later Sheldon[1] described from Minnesota *P. rigidulum*, a plant treated in this paper as a variety of *P. coccineum*.

Further subdivision in the amphibious group is chiefly the work of Greene.[2] This writer was one of the first, and the principal modern American botanist, to advocate the elevation to generic rank of the various subordinate groupings proposed by Meisner and others, and he published the proposed species of these plants under the generic designation *Persicaria*, which seems to have been very generally used in pre-Linnean time. Greene was also most emphatic in his opinion that the European *Polygonum amphibium* L. was distinct from any American species (though characteristically not considering it necessary to record any detailed statement of the differences). His general opinions as to the amphibious group are expressed in the following excerpt:

"The view reached by myself after years of observation upon living plants both at the West and at the East is that we have a number of distinct species that are normally aquatic, and as many more that are normally terrestrial; and that our aquatic plants, at least in several instances, appear as riparian plants with wonderfully changed foliage, and that several of our normally terrestrial species do, under certain conditions, develop aquatic branches with floating foliage, this also strangely altered from the terrestrial type, yet at the same time most unlike that of the truly aquatic species in general.

I also suspect that some of the aquatic, or at all events some riparian species exist in even a third state, more strictly terrestrial, with a third set of strongly marked peculiarities of habit and foliage, and that in such third form the plants flower either very rarely or never at all."

Greene's observations thus correspond to a certain extent with those of European authors elsewhere cited, who recognize three principal adaptations of *P. amphibium*, usually referred to as the varieties *natans* Moench, *terrestre* Leers, and *maritimum* Dethard., according to occurrence in water, as emersed or terrestrial, or in an arid habitat

[1] Sheldon, Bull. Geol. Nat. Hist. Surv. Minn. ix. 14 (1894).
[2] Greene, *Certain Polygonaceous Genera.* Leaflets, i. 17–50 (1904).

such as a sand-dune. Greene also emphasized the idea that these adaptive modifications were "states or phases, not varieties, so that to give them any kind of separate rank, or to assign them names as such would be to misrepresent the facts in the case, and therefore to be unscientific." He remarked also that

"The delimitation of species will be most difficult, so long as a number of the species are known in only one of the three of their possible phases. Nevertheless, I am about to propose a very considerable number of new species: and shall found some upon the aquatic phase only, others upon a riparian state only, as well as many more upon properly terrestrial plants, In the case of these last I am the less afraid of erring, knowing as I think I do, that these are more commonly of one phase only. But in the case of the normally aquatic, I shall doubtless found aggregates . . . .

Here, then is work for many a future generation of botanists . . . it must be begun in the field, and carried on there, patiently and persistently."

It might be remarked that this is not the only case in which Greene's labors have provided "work for many a future generation of botanists." He also declined

"To make any use or application of old varietal names, such as *terrestris*, *emersa*, *Muhlenbergii*, *natans*, and others. No one knows, and perhaps no one will ever know, what the forms or states or phases were to which the authors applied the names; and to use them ignorantly of their first application is but to make confusion worse confounded."

The "very considerable number of species" amount to 44, to which another, *P. Andrewsii*, was later added. Four—*Persicaria fluitans* (Eaton) Greene, *P. coccinea* (Muhl.) Greene, *P. rigidula* (Sheldon) Greene, and *P. Hartwrightii* (Gray) Greene, had been described by previous writers. The rest are "new." The diagnoses, discussions, and citations of specimens cover some 24 pages; no keys are given. The following excerpt indicates the general method followed:

"A diligent study of much material from almost all parts of the United States, occurring in the herbaria under the name of *Polygonum Muhlenbergii*, more recently denominated *P. emersum*, has shown that this also is an aggregate of species, some of them strongly marked, others less so. They differ from one another markedly as to leaf outline and also as to the attitude of the foliage, the leaves in some spreading away from the stem almost divaricately, but in the greater number being ascending or suberect. As to the pubescence, they exhibit not only different degrees but different kinds of hairiness; and that of the midvein beneath invariably differs from that of the

superficies of the leaf. In both the form and the indument of the bracts of the spikes one finds also another set of specific characters."

Of the total number of species 4 were described as from Greene's own collection. The number of specimens cited does not in most cases exceed three.

All Greene's species were transferred to *Polygonum* by Fedde in 1905. This transfer is obviously to be taken as merely a matter of form, based on a different conception of the genus, rather than as an expression of judgment of the validity of the species proposed.

It may be in order to interpolate at this time the views of the present writer as to the validity of these "species." Type or duplicate type material of a considerable number is available at the Gray Herbarium, and a considerable study of this material, together with comparison of the characteristics of the different types with each other and with those believed to be valid as distinctions throughout the North American Persicarias, indicates that for the most part the specimens present habital and ecological variations which are extremely inconstant when traced through a considerable amount of material. As much variation may be observed between some of the duplicate types as between many of the separate "species." Some of them may be entitled to rank as varieties, and the interblending and inconstancy of differential characteristics renders the establishment of satisfactory lines of demarcation extremely difficult. If the hypothesis of interbreeding mentioned elsewhere should prove to have any validity, this interblending, accompanied as it is by a high degree of sterility, will be further explained. In the present state of our knowledge, the writer believes that the subject of the American amphibious Persicarias may best be handled without attempting a high degree of technical subdivision upon the rather elusive characters which exist. The present treatment recognizes under *Polygonum natans* a variety based upon *Persicaria insignis* Greene, an aquatic form characterized by unusually large flowers; and under *Polygonum coccineum* a variety based primarily on *Persicaria pratincola* Greene, emended. The latter variety as here understood includes the usually strigose-hairy types of the general region of the Mississippi Valley. In this area *Polygonum natans* appears to be absent, and the material referable to *P. coccineum* shows a somewhat greater constancy and tendency to increased fertility as compared with the types occurring where the ranges of the species coincide. Another variety of *P.*

coccineum, based on *P. rigidulum* Sheldon, is also recognized. It is quite possible that further field study, undertaken with the findings of the present paper in mind, may establish other varieties.

To complete at this time the account of the Greene influence in the study of this group of plants, mention must be made of the work of Nieuwland[1] which covers some 70 pages and is the most voluminous American treatment of the amphibious group. It includes a considerable review of the pre-Linnean literature, introduced, aside from its historical value, to indicate that Linnaeus and his predecessors knew that *Polygonum amphibium* was amphibious, and that the variations between plants of water and land habitat were on that account not deemed worthy by them of varietal rank. In general the paper is an amplification of the viewpoint of Greene:

"There is no logical alternative between accepting the Linnean view of one sole species of amphibious Smartweed on the one hand, and Dr. Greene's view of a number of valid and distinct species on the other."

Greene's opinion as to the absence of *P. amphibium* in America is again asserted, and the lack of herbaceous ocrea-borders in the European species is brought out. A new subdivision of the group, said to be based on a vast amount of field study, is proposed, together with two new species and one new variety. The paper includes lengthy discussions of various phases of the species described. The following synopsis of Nieuwland's treatment, which includes the sub-headings and lists of the species, has been prepared by the present writer, The plants are treated as belonging to the genus *Persicaria*, which Nieuwland traces back to Tragus in 1531.

Persicaria § Potamocallis.[2] Perennial plants typically amphibious, with rose-colored to crimson flowers (never white).

Subsection I. Emersae. Plants never having spreading herbaceous borders to the ocreae in any of the phases.

P. amphibia (L.) S. F. Gray. *P. coccinea* (Muhl.) Greene and var. *asprella* Greene. *P. pratincola* Greene. *P. vestita* Greene. *P. grandifolia* Greene. *P. rigidula* (Sheldon) Greene. *P. lonchophylla* Greene. *P. tanacophylla* Nieuwland.

Subsection II. Hartwrightianae. Plants having more or less spreading herbaceous borders to the ocreae, usually in the terrestrial phase,[3] sometimes only in the terrestrial spring sterile and disappearing later.

[1] Nieuwland, *Our amphibious Persicarias*. Am. Midl. Nat. ii. 1–24, 200–247 (1911–12).

[2] Termed a subgenus in Nieuwland's summary.

[3] This sentence is taken verbatim from Nieuwland's paper.

P. carictorum Nieuwland. *P. mesochora* Greene and var. *arenicola* Nieuwland. *P. ammophila* Greene. *P. nebrascensis* Greene. *P. Hartwrightii* (A. Gray) Greene.

Subsection III. Hydrophilae. Provisional.[1] Plants as far as known without any terrestrial phase, deep water aquatics with glabrous slimy foliage. Spreading borders to the ocreae always absent.

P. fluitans (Eaton) Greene. *P. canadensis* Greene.

In investigating the influence of change of habitat, Nieuwland found it difficult to force terrestrial phases to aquatic life; the terrestrial plants died, he reports, on being put in water. He also failed to germinate the seed, and never found a single indubitable seedling. In view of the fact that the more typical members of the subgenus *Persicaria* produce large quantities of viable seeds, the latter observation is of some interest. The few achenes found in the panicles of these plants often appear imperfect, but from herbarium material it cannot be asserted that they would not have properly matured in nature, though there may be a strong suspicion to that effect. Irmisch[2] witnessed the germination of the European *Polygonum amphibium.*

Other writers besides Greene, and before as well as afterward, have given some attention to the nomenclatorial rank of the variations or forms of these plants.[3] The specific identity of *Polygonum Hartwrightii* and the American floating species was reported by Bissell,[4] who noticed the occurrence of the foliage of *P. Hartwrightii*

[1] (Footnote from the original.) This subsection will probably disappear as the members become better known or their terrestrial phases found. It may be that the plants have no terrestrial phase, however, and in that case it will remain, unless another more obvious method of division seem feasible.

[2] Irmisch, Bot. Zeit. xix. 105–109 (1861).

[3] In connection with the rather derisive views of the last two writers cited regarding the mentality of those who had presumed to denote them as "varieties" it might be pointed out that the varietal concept as a whole has been rather ill-defined, and that the early writers, particularly the Europeans, in denoting these subdivisions as "varieties" or by Greek letters which have been more or less generally translated with that significance, were not thereby expressing their ignorance of the nature and relationship of the various plants in question, which they usually understood fully as well as have their latter-day critics. It has usually been the aim of systematic botany to devise a system of categories to denote entities and relations in a readily comprehensible and succinct manner. The "var." or the Greek letter has simply been used in the past as a more or less non-committal way of denoting something recognizable, yet of less rank than a species. With the adoption of the International Code with its provisions for ranks below the specific, the situation is becoming somewhat clarified, and the term "forma" is coming into usage to denote ecological responses of the type here dealt with. Certainly there is nothing unscientific in the application of appropriate terminology to denote a recognizable entity.

[4] Bissell, *Biological Relationship of Polygonum Hartwrightii to P. amphibium,* Rhodora, iv. 104, 105 (1902).

and intergrading forms on the rhizomes or stems of the previously floating plant after a drouth in Shuttle Meadow Lake, Southington, Connecticut. He drew attention to analogous conditions in *Ranunculus multifidus* and its variety *terrestris* and *Myriophyllum ambiguum* and its variety *limosum*, and proposed the designation *P. amphibium*, var. *Hartwrightii*. He also noted that the land-form was notoriously sterile, it being a rare thing to find it in fruit in that region. The name as modified by Bissell was taken up by Robinson & Fernald in the seventh edition of Gray's Manual, with the note—

"Am ambiguous plant, sometimes clearly a mere terrestrial and mostly sterile state occurring on the same rootstock as the typical form, but elsewhere seemingly a normal and well-marked fertile variety."

Blake,[1] on the basis of Bissell's observations and his own, reduced the varieties *Hartwrightii* and *terrestre* to formae. The latter designation cannot hold, since forma *terrestre* (Leers) Blake is based nomenclatorially on the terrestrial form of the European, not the American species; but it appears to the present writer correct to preserve the viewpoint of Blake and to denote as formae the obviously ecological variations of the American as well as European amphibious Persicarias.

As to *P. coccineum*, Wiegand[2] has assigned its var. *aquaticum* Willd. to lower rank as *P. Muhlenbergii* forma *natans*. While the choice of this as a formal name may be deemed very unfortunate, in view of the priority of "*natans*" as a specific for the plant named by Eaton, and as a formal name under *P. amphibium* (or varietal in the long-established European usage), it is evidently, when transferred to *P. coccineum*, to be held valid under the International Code.

[1] Blake, Rhodora xv. 164 (1913).
[2] Wiegand, Rhodora, xxvi. 3 (1924).

(*To be continued*)

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